

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
4 January 2001 (04.01.2001)

PCT

(10) International Publication Number
WO 01/00842 A3(51) International Patent Classification⁷: C12N 15/31, 15/52, 9/00, C07K 14/34 199 42 088.2 3 September 1999 (03.09.1999) DE

(21) International Application Number: PCT/IB00/00911

(71) Applicant: BASF AKTIENGESELLSCHAFT [DE/DE]; D-67056 Ludwigshafen (DE).

(22) International Filing Date: 23 June 2000 (23.06.2000)

(72) Inventors: POMPEJUS, Markus; Wenjenstrasse 21, D-67251 Freinsheim (DE). KRÖGER, Burkhard; Im Waldhof 1, D-67117 Limburgerhof (DE). SCHRÖDER, Hartwig; Goethestrasse 5, D-69226 Nussloch (DE). ZELDER, Oskar; Rossmarktstrasse 27, D-67346 Speyer (DE). HABERHAUER, Gregor; Moselstrasse 42, D-67117 Limburgerhof (DE).

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/141,031	25 June 1999 (25.06.1999)	US
199 31 636.8	8 July 1999 (08.07.1999)	DE
199 32 125.6	9 July 1999 (09.07.1999)	DE
199 32 126.4	9 July 1999 (09.07.1999)	DE
199 32 127.2	9 July 1999 (09.07.1999)	DE
199 32 128.0	9 July 1999 (09.07.1999)	DE
199 32 129.9	9 July 1999 (09.07.1999)	DE
199 32 226.0	9 July 1999 (09.07.1999)	DE
199 32 920.6	14 July 1999 (14.07.1999)	DE
199 32 922.2	14 July 1999 (14.07.1999)	DE
199 32 924.9	14 July 1999 (14.07.1999)	DE
199 32 928.1	14 July 1999 (14.07.1999)	DE
199 32 930.3	14 July 1999 (14.07.1999)	DE
199 32 933.8	14 July 1999 (14.07.1999)	DE
199 32 935.4	14 July 1999 (14.07.1999)	DE
199 32 973.7	14 July 1999 (14.07.1999)	DE
199 33 002.6	14 July 1999 (14.07.1999)	DE
199 33 003.4	14 July 1999 (14.07.1999)	DE
199 33 005.0	14 July 1999 (14.07.1999)	DE
199 33 006.9	14 July 1999 (14.07.1999)	DE
199 41 378.9	31 August 1999 (31.08.1999)	DE
199 41 379.7	31 August 1999 (31.08.1999)	DE
199 41 390.8	31 August 1999 (31.08.1999)	DE
199 41 391.6	31 August 1999 (31.08.1999)	DE

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:
23 August 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: *CORYNEBACTERIUM GLUTAMICUM* GENES ENCODING PROTEINS INVOLVED IN HOMEOSTASIS AND ADAPTATION(57) Abstract: Isolated nucleic acid molecules, designated HA nucleic acid molecules, which encode novel HA proteins from *Corynebacterium glutamicum* are described. The invention also provides antisense nucleic acid molecules, recombinant expression vectors containing HA nucleic acid molecules, and host cells into which the expression vectors have been introduced. The invention still further provides isolated HA proteins, mutated HA proteins, fusion proteins, antigenic peptides and methods for the improvement of production of a desired compound from *C. glutamicum* based on genetic engineering of HA genes in this organism.

WO 01/00842 A3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/00911

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/31 C12N15/52 C12N9/00 C07K14/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 93 09225 A (MASSACHUSETTS INST TECHNOLOGY) 13 May 1993 (1993-05-13) page 8	1,2, 8-19,22, 25-34,37
X	--- EIKMANN ET AL: "The phosphoenolpyruvate carboxylase gene of Corynebacterium glutamicum: molecular cloning, nucleotide sequence, and expression" MOL. GEN. GENET,XX,XX, vol. 218, 1989, pages 330-339, XP002138580 page 333, column 1, paragraph 2 page 330, column 2, paragraph 2	1,2, 8-19,22, 25-34,37
X	--- EP 0 401 735 A (KYOWA HAKKO KOGYO KK) 12 December 1990 (1990-12-12) claims 1-4 --- -/-	1,2, 8-19,22, 25-34

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

19 December 2000

Date of mailing of the international search report

23.03.01

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Mata-Vicente, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/00911

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	LEE J -K ET AL: "NUCLEOTIDE SEQUENCE OF THE GENE ENCODING THE CORYNEBACTERIUM GLUTAMICUM MANNOSE ENZYME II AND ANALYSES OF THE DEDUCED PROTEIN SEQUENCE" FEMS MICROBIOLOGY LETTERS,AMSTERDAM,NL, vol. 119, no. 1-2, 1994, pages 137-146, XP000960685 ISSN: 0378-1097 abstract	1,2, 8-13, 15-19, 22, 25-27, 30,31, 34,37
X	--- DATABASE EMBL/GENBANK/DBJ [Online] EBI; 17 May 1996 (1996-05-17) "M. tuberculosis H37Rv complete genome; segment 57/162" XP002155887 Acc. No. Z73419 -----	6-13,17, 23, 25-27, 30,31, 34,37

INTERNATIONAL SEARCH REPORT

Int tional application No.
PCT/IB 00/00911

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although as far as an "in vivo" method is concerned, claim 35 is directed to a diagnostic method practised on the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Claims 1-38 (partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: Invention 1 : Claims (1-38) - partially

Isolated nucleic acid molecule from *Corynebacterium glutamicum* of SEQ ID NO:1; the polypeptide thereby encoded (SEQ ID NO:2); fragments, variants and fusions thereof; expresion vectors comprising the polynucleotide of the invention or its derivatives, host cells transfected with said vectors and methods for the production of fine chemicals involving the culture of said host cells; use of the above-mentioned polynucleotide/polypeptide for diagnosis of *Corynebacterium diptheriae* infections.

2. Claims: Inventions 2-174 : Claims (1-38) - partially

Idem as subject 1, but limited to the rest of the sequence pairs (polynucleotide-polypeptide) listed in Table 1, with the exception of the F-designated ones (disclaimed).

INTERNATIONAL SEARCH REPORT

International Application No

PCT/18 00/00911

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9309225	A	13-05-1993	NONE	
EP 0401735	A	12-12-1990	JP 2967996 B	25-10-1999
			JP 3007591 A	14-01-1991
			DE 69022631 D	02-11-1995
			DE 69022631 T	21-03-1996
			DE 401735 T	13-06-1991
			KR 9701238 B	04-02-1997
			US 5447857 A	05-09-1995
			US 5407824 A	18-04-1995